DOCUMENT RESUME

ED 223 358 PS 013 212

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TITLE Treating Cognitively Impulsive Children Using Academic Materials and Peer Models.
PUB DATE [82]
NOTE 34p.; Paper based on Ph.D. Dissertation, Indiana State University.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; Arithmetic; *Behavior Modification; *Conceptual Tempo; *Elementary School Students; Intermediate Grades; Measures (Individuals); Reading Ability; Spelling; *Training Methods
IDENTIFIERS *Peer Modeling; *Treatment Outcomes

ABSTRACT

The effectiveness of a peer-modeling treatment in the modification of impulsive cognitive style and in the improvement of academic performance in the areas of reading, spelling and arithmetic is investigated in this study. In four single case experiments, eight fifth grade children identified by the Matching Families Figures Test Form 20 (MFF20) as cognitively impulsive received treatment via subject-nominated reflective peers using Meichenbaum's (1977) cognitive behavior modification strategies. Each experiment employed materials, differing in content (Matrices and Mazes, Reading, Spelling, and Arithmetic), and incorporating a response-uncertainty format. Comparisons of subjects' pre- and post-performances on the MFF20 and quizzes in reading, spelling and arithmetic suggest that training with academically relevant materials yields improved academic performance and change in subjects' impulsive/reflective status. (MP)

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TREATING COGNITIVELY IMPULSIVE CHILDREN USING ACADEMIC MATERIALS AND PEER MODELS

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Four single case experimental studies, each with an internal direct replication, were conducted to test for the training and generalization effects of a treatment "package" designed to train for cognitive reflectivity.

Eight cognitively impulsive fifth grade subjects received treatment via subject-nominated reflective peers using Meichenbaum's cognitive behavior modification strategies. Each experiment employed materials, differing in content (Matrices and Mazes, Reading, Spelling, and Arithmetic), and incorporating a response-uncertainty format.

Pre to post comparisons on MFF20, and quizzes in Reading, Spelling and Arithmetic suggest that training with academically relevant materials yields improved academic performance and change in impulsive/reflective status.

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This study is based on a doctoral dissertation submitted to the Indiana State University by the first author under the supervision of the second and third authors.

Research conducted by Kagan and his associates (Kagan, 1965a; Kagan, 1965b; Kagan, 1965c; Kagan, Pearson and Welch, 1966a; Kagan, Pearson and Welch, 1966b) has focused on the existence of differential thinking or cognitive style termed reflection-impulsivity. When the uncertainty of a response is high and several responses are available, the individual termed reflective decides carefully, withholding a response until there is a higher probability of answering correctly. Impulsive individuals choose quickly with less evaluation of various alternative responses (Ward, 1968).

It has been shown that impulsivity may be accompanied by poor cognitive performance in response-uncertainty tasks (Kagan, 1965a; Kagan, 1965c; Kagan, Pearson, and Welch, 1966a). Change in impulsive cognitive style can help lead to improved academic performance (Parrish and Erickson, 1978). Various academic tasks require the mastery of inference as a key tool. An incorrect response is often interpreted as indicative of a lack of knowledge, rather than an indication of the poor quality of the inferential process. It may be profitable to train the impulsive child in reflection when facts and rules are introduced in order to improve the general quality of academic performance (Kagan, Pearson and Welch, 1966a).

Four major types of interventions which have been successful in modifying impulsive cognitive style are (1) forced delay, (2) reinforcement for increasing response time or decreasing errors, (3) the teaching of scanning strategies directly, and (4) modeling (Messer, 1976). An effective modeling intervention utilizes sociometrically chosen peers to model reflective behavior (Cohen and Przybycien, 1974). Peer-modeling, when combined with opportunities for observer and participant modeling, can be a useful, time-saving, and continually reinforcing procedure influencing behavioral change in the impulsive child (Bandura, 1977). Opportunities for observing and participating with a peer in desired

reflective behavior in the classroom setting may enhance the modification of impulsive cognitive style without requiring teacher time or excessive training time outside the classroom (Debus, 1970). Using a peer-modeling intervention involving classroom tasks as well as structured exercises, the impulsive child may acquire increased familiarity and competence, and may thereby become more motivated to adopt reflective procedures (Bandura, 1977).

The present study proposed to test a peer-modeling treatment for the modification of impulsive cognitive style and the improvement of academic performance in the areas of Reading, Spelling and Arithmetic. In order to train for and to allow assessment of generalization effects of treatment interventions, this study included the use of academically relevant materials. Toward these purposes, the following research question was investigated: Do treatment effects and generalization of treatment effects to academic areas and to the modification of impulsive cognitive style occur in students receiving a peer-modeling intervention using training materials specific to the treatment?

METHOD

As recommended by Kendall and Finch (1976), an N of 1 experimental design was utilized in the study. Bergin and Strupp (1972) have suggested use of such a design in conducting applied or field research in an effort to overcome selected problems inherent in group comparison designs.

The N of 1 design for the study incorporated an internal direct replication as suggested by Hersen and Barlow (1975). Direct replication can help indicate that, within the limits of the data, results of treatment are reliable and not due to idiosyncrasies in the first subject.

Four N of 1 studies were conducted. Each study was identical in that they all employed a peer modeling, performance-relevant process skills treatment

(Meichenbaum, 1977) package. The studies varied by type of training materials used as part of treatment.

The design included a pre-treatment, baseline data collection period of two weeks; a treatment data collection period of three weeks; and a return to baseline condition, follow-up data collection period of two weeks.

Subjects

The subjects were selected from a pool of volunteering fifth-grade school children who had obtained parental consent to participate in the study. Children who evidenced emotional disturbance, were classified as emotionally disturbed or learning disabled, were receiving mood or activity medication, were diagnosed as brain-damaged or epileptic, or were participating in behavioral management programs to improve behavioral or academic performance were excluded from the pool.

Eighty-six children were administered the MFF20. Of this group, the eight most impulsive children, as defined by a quadrant design based on a median split procedure (Block, Block and Harrington, 1974), were identified as subjects. The median for error scores was seven. The median for latency scores was 12.8 seconds.

The eight impulsive subjects were randomly assigned to the four treatment conditions.

Peer Models

Eight peer models were identified using two criteria. Status of "reflective" was determined via the MFF20. Peers fell in the reflective quadrant using the median split procedure. Additionally, total scores from a sociometric scale recommended by Best (1977) were used to identify peer model status. The scale

is designed to elicit the child's (impulsive subject's) perceptions of the intelligence, competence and popularity of the peer model (reflective child).

Treatment

Each of the eight subjects received nine, 30-minute sessions of training with their respective reflective peer models. Treatment provided by the peer models followed Meichenbaum's (1977) performance-relevant skills training. Skills included (1) problem definition, (2) focusing attention and response guidance, (3) self-reinforcement, and (4) self-evaluative coping skills and error correcting options. A process strategy tested on a variety of populations by Meichenbaum and Goodman (1971) and others (Meichenbaum, 1977; Kendall and Finch, 1976; Nelson and Birkimer, 1978) was employed. This strategy consists of a five-part program: (1) cognitive modeling, (2) overt, external guidance, (3) overt self-guidance, (4) faded (whispered) overt self-guidance, and (5) covert self-instruction.

Peer models were trained with the aid of a written script which spelled out what the peer model could say to his/her impulsive peer such that the treatment process would be faithfully executed. Training and monitoring of reflective peer modeling was done by two graduate students familiar with the training procedures. Rehearsals with the reflective models were held until mastery was achieved.

All eight subjects received the same performance-relevant skills training using the above described process strategy. Subjects one (1) and two (2) were trained using Task-Specific Materials. Subjects threee (3) and four (4) received training with Reading Materials. Spelling Materials were employed in training subjects five (5) and six (6). Arithmetic Materials were used with subjects seven (7) and eight (8).

Training for all subjects extended over a three week period of time with three thirty-minute training sessions per week.

Training Materials

Task-Specific Materials consisted of a variety of non-verbal response-uncertainty formatted tasks such as matrices and mazes. Reading Materials utilized reading comprehension materials in a response-uncertainty format. The format consisted of the use of four similar pictures of alternatives accompanied by a sentence of varying difficulty (the standard). Spelling Materials consisted of four alternative spellings of a single word pronounced by the peer models. Words varied in difficulty. The response uncertainty format was slightly different from that of the other three types of materials in that the standard was presented orally. Arithmetic Materials, presented in a response-uncertainty format, consisted of an arithmetic problem (standard) followed by four alternative responses.

Instruments

The Matching Familiar Figures Test, Form 20 (Messer, 1976) was used to measure reflection-impulsivity. MFF20, Set A was used as a pre-treatment measure; Set B as a post-treatement measure (Cairns and Cammock, 1978).

MFF20, Set A was administered the first week of the baseline period. MFF20, Set B was administered the seventh or last week during the follow-up, return to baseline period.

Measures of academic performance consisted of teacher constructed quizzes in Reading, Spelling, and Arithmetic. Each quiz was constructed in the form of a response-uncertainty task or a task parallel in form to a response-uncertainty

task. Prior to data collection, teachers were instructed on types of quizzes to be used. Two quizzes in each of the three academic areas were administered each week for the duration (seven weeks) of the experiments. The total number of items per week per academic area was ten.

Data Analysis

MFF20 data were in the form of error scores and latency scores. Using the median split procedure, each subject's pre-treatment and follow-up reflection-impulsivity status was identified. Change in status from impulsive to reflective was taken as evidence of treatment effect.

A variation of the t test, as discussed by Herson and Barlow (1976), was employed to assess baseline to follow-up differences on quizzes in the three academic areas. Shine and Bower's (1971) suggestion for the construction of an error term for the use of a t test in an N of 1 design was followed.

RESULTS

Task-Specific Materials - Subject #1

Subject #1's baseline and follow-up MFF20 error scores were 11 and 8 respectively. Baseline and follow-up mean latencies (seconds) were 8.3 and 14.1. The reduction in errors and increased latency placed subject #1 in the reflective quadrant. The change in status from impulsive to reflective quadrant is taken as support for the treatment effect of peer modeling with task-specific materials.

To assess generalization of treatment using Task-Specific materials a visual and statistical presentation of quiz scores in Reading (R), Spelling (S), and Arithmetic (A) is supplied. The question addressed is: Does training with Task-Specific Materials reduce the number of errors a subject commits when taking quizzes in three academic areas?

Figure 1 shows, graphically, error percent scores on quizzes in Reading (R), Spelling (S), and Arithmetic (A) during baseline, treatment, and follow-up. Subject #1 slightly increased errors in S and A.

Table 1 presents the t-test analysis of error scores in R, S, and A. No t value was significant. Thus, there is no evidence of generalization.

Task-Specific Materials - Subject #2

Subject #2's baseline and follow-up MFF20 error scores were 8 and 4 respectively. Baseline and follow-up mean latencies (seconds) were 9.1 and 16.4. The reduction in errors and increase in latency placed subject #2 in the reflective quadrant. The change in reflection-impulsivity status is taken as support for the treatment effect of peer modeling with task-specific materials.

Figure 2 shows that subject #2 decreased errors in R and S while showing no improvement in A.

Table 1 shows that there was a significant ($t=2.393$) decrease in mean errors in R. Thus, training with Task-Specific Materials showed generalization effects to R, but not to S and A.

Reading Materials - Subject #3

Treatment effects of peer modeling using Reading Materials are shown in Figure 3 on the graph labeled Reading. Subject #3 increased number of errors for R quizzes. No positive treatment effects are indicated. Furthermore, Table 3 shows a non-significant t value for R. Thus, there was no evidence of treatment effects for peer modeling with Reading Materials.

Generalization effects for peer modeling with Reading Materials were not found. This is shown in Figure 3, graphs labeled Spelling and Arithmetic. Lack of generalization is also shown in Table 3. T values for S and A are non-significant.

SUBJECT #1 (TASK-SPECIFIC MATERIALS)

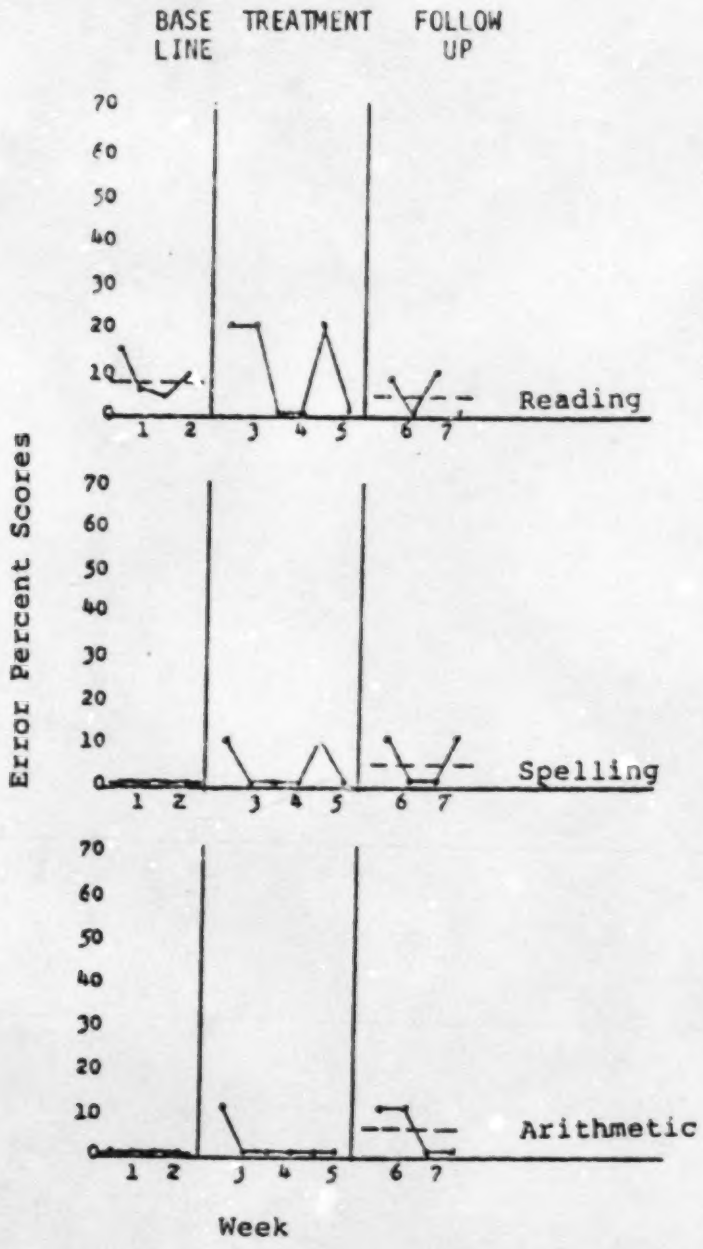


Figure 1
Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period.

Subject # 1 (Task-Specific Materials)

Table 1

Error Percent Score Means and Standard Deviations for Baseline and Follow-up on Reading Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	8.8	4.5	4.3	5.1	1.325
Spelling	0	0	5.0	5.8	0
Arithmetic	0	0	5.0	5.8	0

*p < .05, **p < .10

SUBJECT #2 (TASK-SPECIFIC MATERIALS)

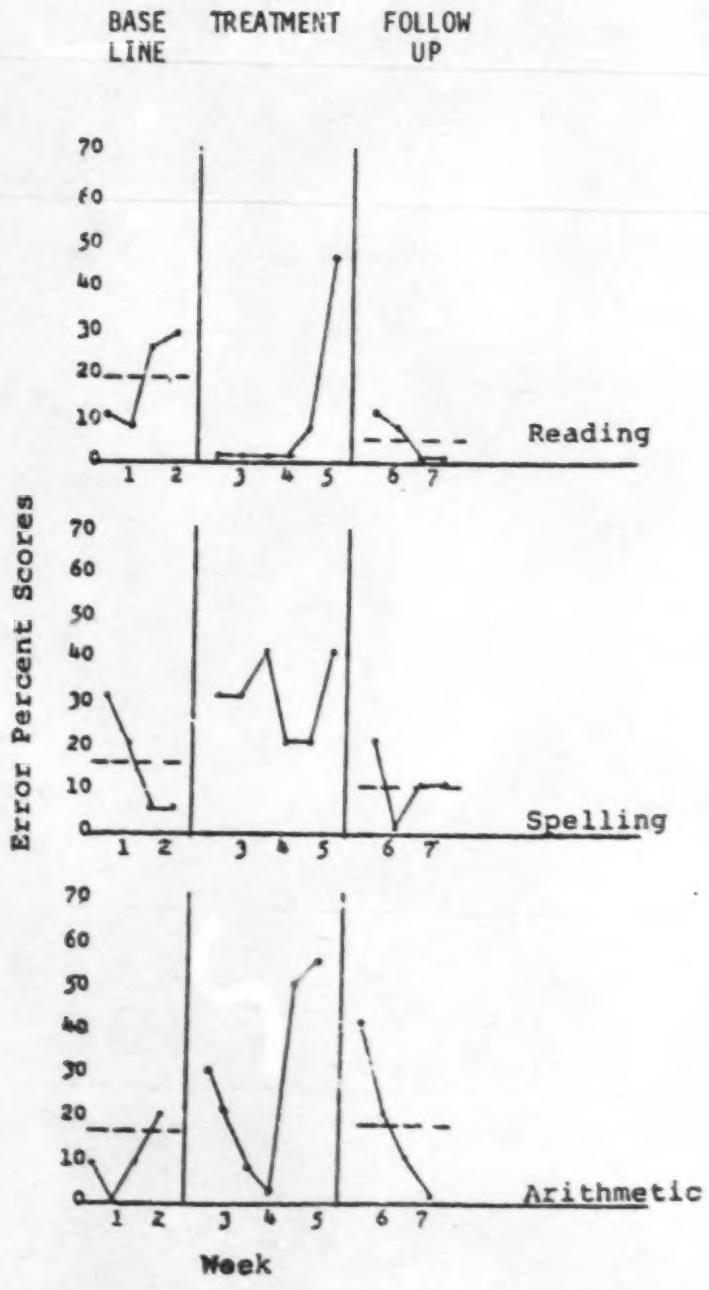


Figure 2

Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period.

Subject # 2 (Task-Specific Materials)

Table 2

Error Percent Score Means and Standard Deviations for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	17.5	9.9	4.3	5.1	2.393*
Spelling	15.0	12.2	10.0	8.2	.679
Arithmetic	17.5	5.0	17.5	17.1	0

*p < .05, **p < .10

Subject #3's MFF20 baseline and follow-up error scores were 8 and 7 respectively. Baseline and follow-up mean latencies (seconds) were 11.6 and 14.8. Subject #3 retained impulsive status. Thus, treatment did not evidence generalization.

Reading Materials - Subject #4

For subject #4, treatment effects of peer modeling using Reading Materials are shown in Figure 4 on the graph labeled Reading. Subject #3 reduced numbers of errors for R quizzes from baseline to follow-up.

Table 4 shows a significant t value of 1.721 for Reading. This demonstrates significant reduction in errors on Reading Quizzes from baseline to follow-up. The peer modeling treatment with Reading Materials was effective.

Generalization effects for peer modeling with Reading Materials were found for A. Figure 4 (Arithmetic) shows, graphically, reduction in errors. Table 4 shows a significant t value for the baseline to follow up reduction in errors on Arithmetic quizzes. No generalization effect was demonstrated in S.

Subject #4's MFF20 baseline and follow-up error scores were 10 and 3 respectively. Baseline and follow-up mean latencies (seconds) were 10.4 and 23.7. The reduction in errors and increase in latency placed Subject #4 in the reflective quadrant. Thus, the change in impulsivity status suggests generalization effects of peer modeling using Reading Materials.

Spelling Materials - Subject #5

For subject #5, treatment effects of peer modeling using Spelling Materials are shown in Figure 5 on the graph labeled Spelling. Subject #5 reduced errors on Arithmetic quizzes to zero at follow-up.

Table 5 shows a significant t value of 1.735 for Spelling. A significant

SUBJECT #3 (READING MATERIALS)

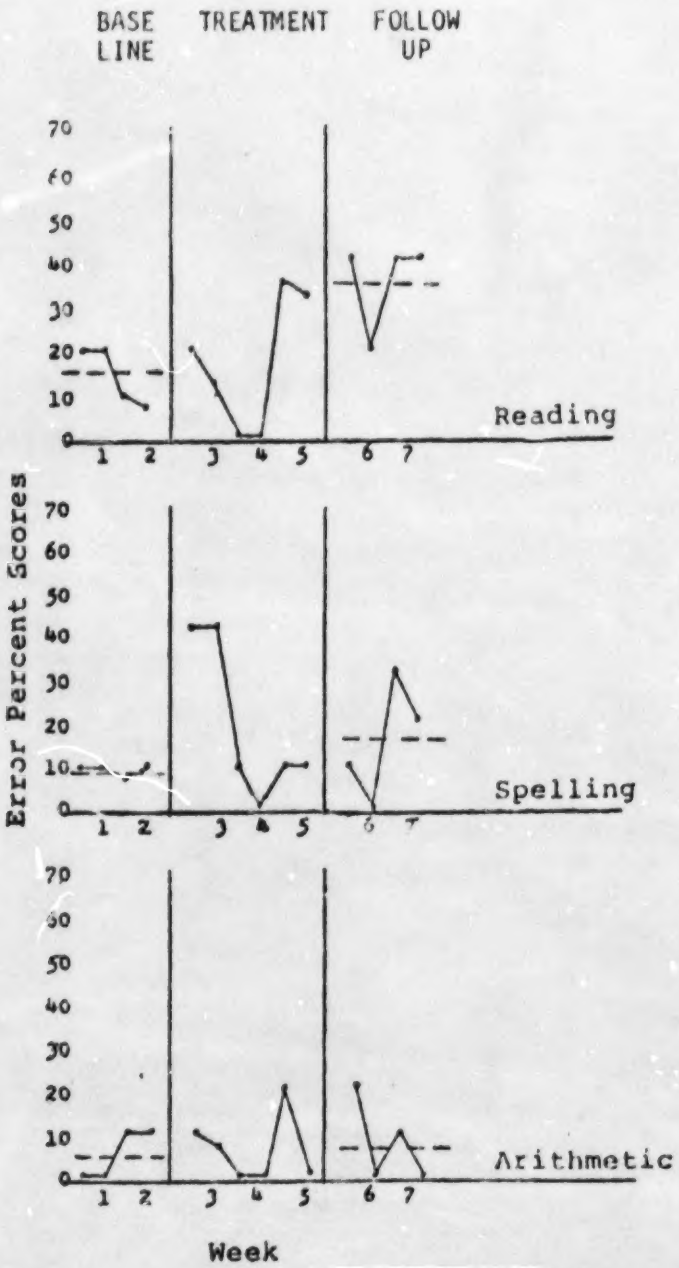


Figure 3

Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period

Subject # 3 (Reading Materials)

Table 3

Error Percent Score Means and Standard Deviations for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	14.8	6.1	35.0	10.0	0
Spelling	9.3	1.5	15.0	12.9	0
Arithmetic	5.0	5.8	7.5	9.6	0

*$p < .05$, **$p < .10$

SUBJECT #4 (READING MATERIALS)

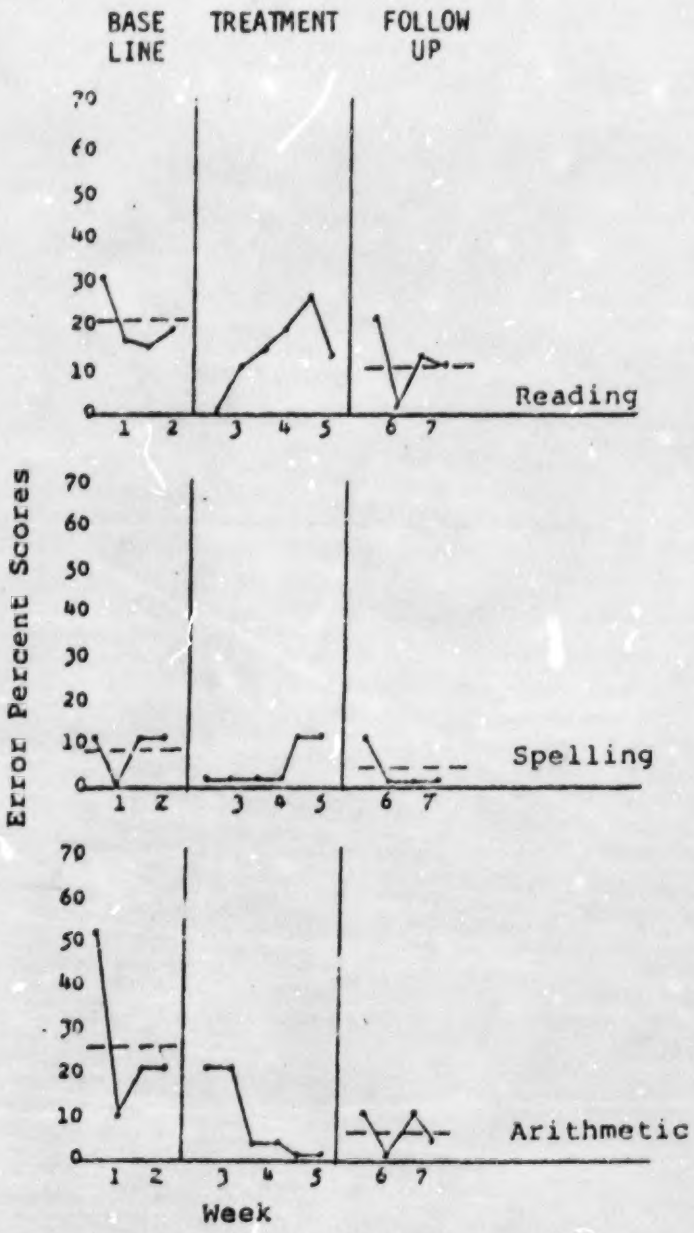


Figure 4

Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period.

Subject # 4 (Reading Materials)

Table 4

Error Percent Score Means and Standard Deviations for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	19.8	6.9	10.5	8.2	1.721**
Spelling	7.5	5.0	2.5	5.0	1.408
Arithmetic	25.0	17.3	6.0	4.9	2.110*

*$p < .05$, **$p < .10$

reduction in errors from baseline to follow-up was achieved. The peer modeling treatment with Spelling Materials was effective.

Generalization effects for peer modeling with Spelling Materials were found for R. Figure 5 (Reading) shows the effect graphically. Table 5 shows a significant t value of 1.649 for Reading. No generalization effect was demonstrated in A.

Subject #5's MFF20 baseline and follow-up error scores were 12 and 2 respectively. Baseline and follow-up mean latencies were 10.5 and 35.5. The reduction in errors and increase in latency resulted in Subject #5 being classified as reflective. The change in impulsivity status suggests generalization effects of peer modeling using Spelling Materials.

Spelling Materials - Subject #6

Treatment effects of peer modeling using Spelling Materials are shown in Figure 6 (Spelling) for Subject #6. The graph shows a reduction in errors from baseline to follow-up.

Table 6 shows a significant t value of 2.459 for Spelling. Subject #6 significantly reduced errors on Spelling quizzes from baseline to follow-up. Peer modeling treatment with Spelling Materials was effective.

Generalization effects for peer modeling with Spelling Materials were not found for R and A. (See Figure 6, Reading and Arithmetic.) No significant t values resulted from comparing baseline and follow-up errors on quizzes in R and A. (See Table 6, Reading and Arithmetic.)

Subject #6's MFF20 baseline and follow-up error scores were 11 and1, respectively. Baseline and follow-up mean latencies (seconds) were 12.2 and 19.5. The reduction in errors and increase in latency resulted in Subject #6 being classified as reflective. The change in impulsivity status suggests generalization effects of peer modeling using Spelling Materials.

SUBJECT #5 (SPELLING MATERIALS)

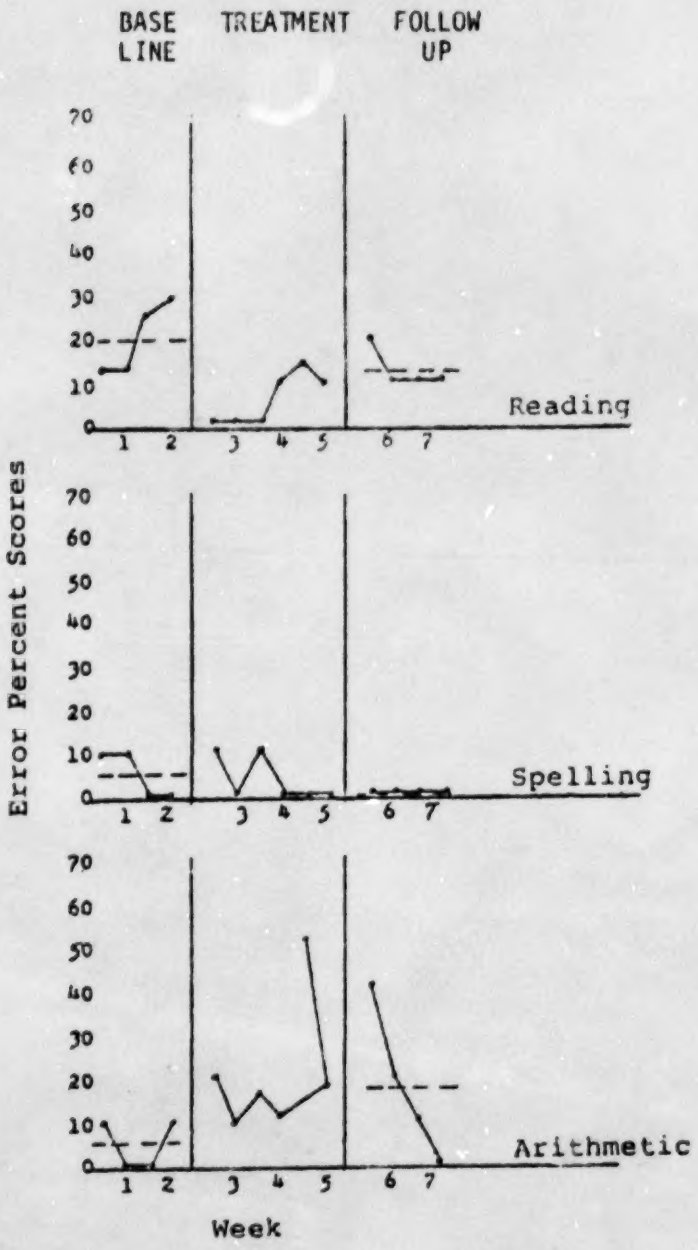


Figure 5

Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period

Subject # 5 (Spelling Materials)

Table 5

Error Percent Score Means and Standard Deviation for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	19.8	7.4	12.5	5.0	1.649**
Spelling	5.0	5.8	0	0	1.735**
Arithmetic	5.0	5.8	17.5	17.1	0

*$p < .05$, **$p < .10$

SUBJECT #6 (SPELLING MATERIALS)

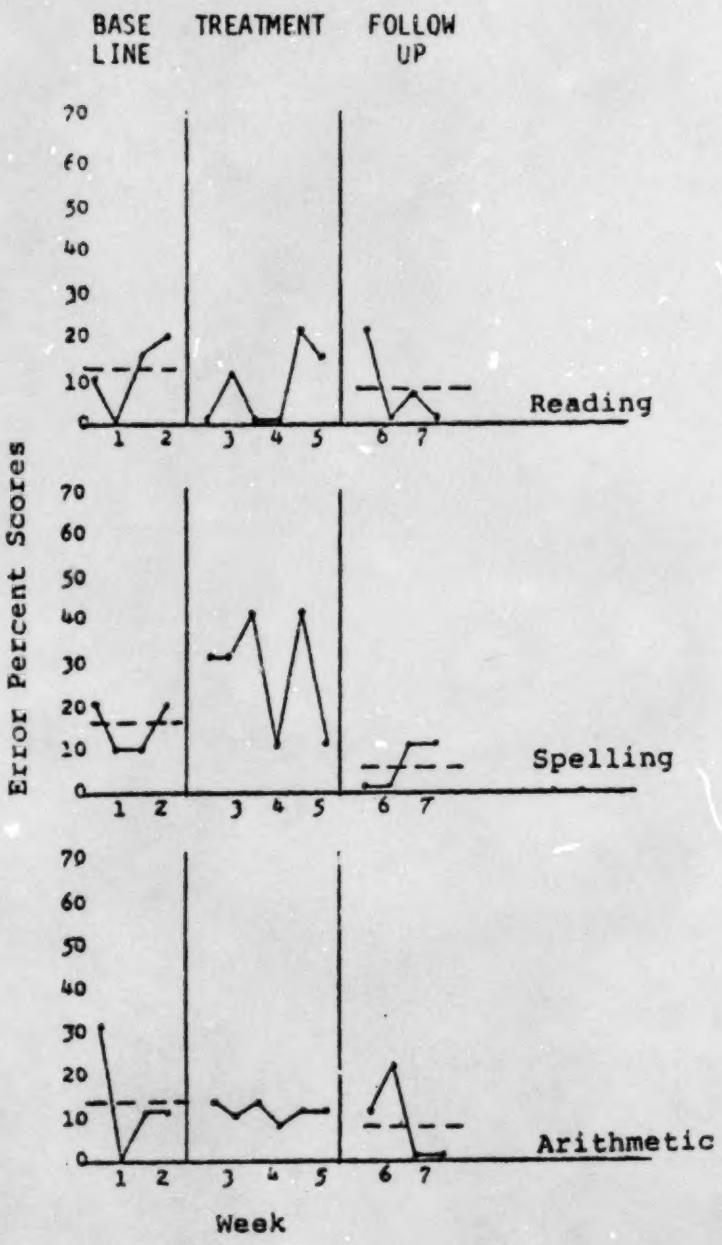


Figure 6

Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period.

Subject # 6 (Spelling Materials)

Table 6

Error Percent Score Means and Standard Deviations for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	10.8	7.9	6.3	9.5	0
Spelling	15.0	5.8	5.0	5.8	2.459*
Arithmetic	12.5	12.6	7.5	9.6	.631

*$p < .05$, **$p < .10$

Arithmetic Materials - Subject #7

For Subect #7, treatment effects of peer modeling using Arithmetic Materials are shown in Figure 7 (Arithmetic). The graph shows an increase in errors from baseline to follow-up.

Table 7 shows a non-significant t value (t=0) for Arithmetic. Subject #7 made more errors on Arithmetic quizzes at follow-up. Peer modeling treatment with Arithmetic Materials was ineffective.

Generalization effects for peer modeling with Arithmetic Materials were not found for R and S. Figure 7 shows no change in errors from baseline to follow-up in Reading. A slight reduction in errors is evident for Spelling. Non-significant t values for Reading (t=0) and Spelling (t=1.337) lead to the conclusion that peer modeling treatment using Arithmetic Materials did not show generalization.

Subject #7's MFF20 baseline and follow-up error scores were 10 and 2, respectively. Baseline and follow-up mean latencies (seconds) were 11.3 and 22.6. The reduction in errors and increase in latency resulted in Subject #7 achieving a status of reflective, thus suggesting generalization of peer modeling treatment with Arithmetic Materials.

Arithmetic Materials - Subject #8

Treatment effects of peer modeling using Arithmetic Materials are shown in Figure 8 (Arithmetic) for Subject #8. The graph shows a slight decrease in errors from baseline to follow-up.

Table 8 shows a non-significant t value of 1.002 (Arithmetic). Subject #8 did not significantly reduce errors on Arithmetic quizzes from baseline to follow-up. Thus, peer modeling treatment with Arithmetic was not effective.

Generalization effects for peer modeling with Arithmetic Materials were found for R but not for S. (See Figure 8.) A significant t-value of 1.584 for Reading resulted from comparing baseline and follow-up errors on quizzes in R.

SUBJECT #7 (ARITIMETIC MATERIALS)

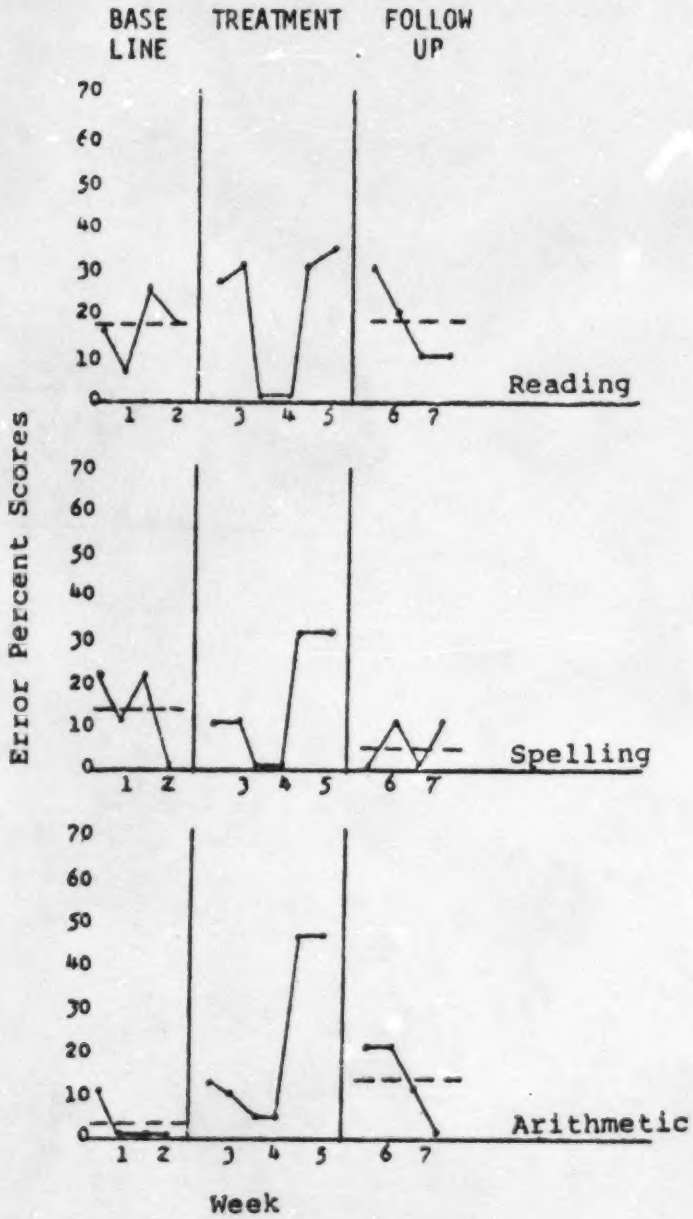
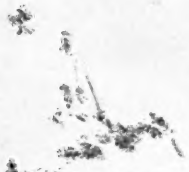


Figure 7
Error Percent Scores for Reading, Spelling and Arithmetic Across a Seven-week Observation Period



Subject # 7 (Arithmetic Materials)

Table 7

Error Percent Score Means and Standard Deviation for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	16.0	7.9	17.5	9.6	0
Spelling	12.5	9.6	5.0	5.8	1.337
Arithmetic	2.5	5.0	12.5	9.6	0

*$p < .05$, **$p < .10$

(See Table 8, Reading.) A non-significant t value of 1.002 was found for S. (See Table 8, Spelling.) Thus, generalization effects for peer modeling using Arithmetic Materials were found in Reading but not in Spelling.

Subject #8's MFF20 baseline and follow-up error scores were 10 and 2 respectively. Baseline and follow-up mean latencies (seconds) were 10.2 and 24.8. Reduction in errors and increase in latency resulted in a reflective classffication for Subject #8. Change in impulsivity status suggests generalization effects of peer modeling using Arithmetic Materials.

DISCUSSION

Task Specific Materials - Subjects #1 and #2

Training effects of peer modeling with Task Specific Materials were demonstrated for both subjects. This result is consistent with the research of Kendall and Finch (1976), and Cohen and Przybycien (1974) which demonstrated that training on non-academic materials such as matrices, mazes and various forms of the MFFT can modify impulsive cognitive style.

Subject #2 showed a generalization effect of training in the academic area of Reading only. Subject #1 showed no generalization effects. O'Leary (1980) has addressed the function of motivation in intervention success or failure. Teachers and trainers who observed Subject #1 noted that this child displayed no increase in personal involvement or effort in learning the training task or in regular classroom work. Subject #2 was described as putting forth more effort in academic performance during treatment and follow-up. Perhaps subject variation in motivation accounts for the relative lack of generalization of treatment effects.

Reading Materials - Subjects #3 and #4

Subject #3 showed no treatment or generalization effects of peer modeling

SUBJECT #8 (ARITHMETIC MATERIALS)

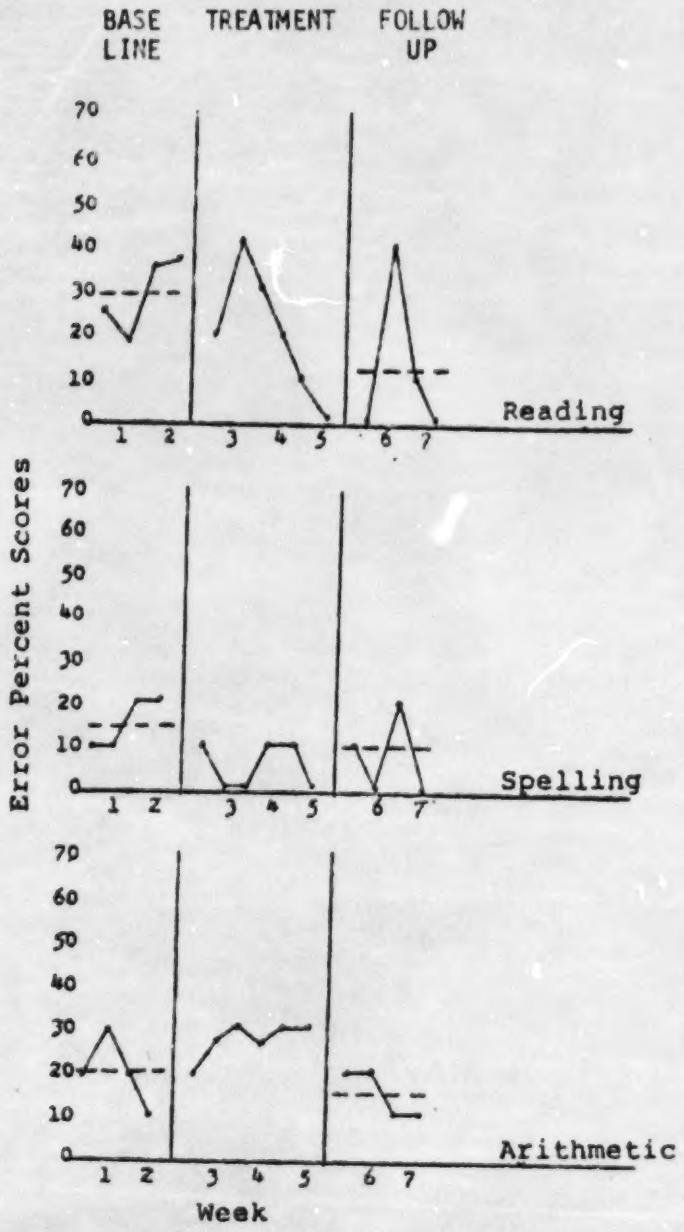


Figure 8

Error Percent Scores for Reading, Spelling and Arrithmetic Across a Seven-week Observation Period

Subject # 8 (Arithmetic Materials)

Table 8

Error Percent Score Means and Standard Deviations for Baseline and Follow-up on Reading, Spelling and Arithmetic Quizzes

Academic Area	Baseline Mean	Baseline Standard Deviation	Follow-up Mean	Follow-up Standard Deviation	t Value
Reading	28.8	8.2	12.5	18.9	1.584**
Spelling	15.0	5.8	10.0	8.2	1.002
Arithmetic	20.0	8.2	15.0	5.8	1.002

*$p < .05$, **$p < .10$

with Reading Materials. Subject #4 showed treatment effects and generalization effects in Arithmetic and non-academic skills (MFF20).

Results for Subject #4 are consistent with the work by Parrish and Erickson (1978) which indicates that training on academic materials can modify impulsive cognitive style assessed by a response-uncertainty measure. Subject #3 suggests the opposite conclusion.

Intraindividual differences may account for the discrepancy in results for Subjects #3 and #4. Two differences related to treatment outcome are noteworthy: (1) personal awareness of an existing problem that may inhibit a student's school performance, and (2) awareness of personal gains to be made by mastering and utilizing the intervention procedure (Friedling and O'Leary, 1979; O'Leary, 1980). Both teachers and the trainer for Subject #3 noted this child's negative attitude toward school. At times Subject #3 was reported to be rebellious and unaware of potential for personal gain possible via treatment.

On the other hand Subject #4 was described as highly motivated and spent time with the trainer discussing concern about grades and relevance of the training for improving academic performance. The substantial treatment and generalization effects for Subject #4 are consistent with the contention of Kagan, Pearson and Welch (1966) that awareness of personal relevance of training procedures is an essential condition for behavior change.

Spelling Materials - Subjects #5 and #6

Subject #5 showed treatment effects of peer modeling with Spelling Materials. Additionally, generalization effects were noted in Reading and in the non-academic area (MFF20). Subject #6 showed treatment effects and one generalization effect (MFF20). These results are consistent with Parrish and Erickson (1978).

Both subjects were described by their respective trainers and teachers as well motivated, concerned about academic performance, and aware of the relevance

of their peer modeling training to improving academically.

It is worthy to note that these two subjects (and the six other subjects exposed to different training materials) showed no generalizat'on effects in Arithmetic. The Arithmetic teacher was consulted on this observation. Upon inspection of Arithmetic scores for all children in this teacher's class, it was discovered that approximately 60% of all students had above average error scores on quizzes administered during the fifth and sixth week of data collection. It was concluded that the quizzes in Arithmetic were not uniform with respect to level of difficulty across the seven week period of the experiments.

Arithmetic Materials - Subjects #7 add #8

Subjects #7 and #8 showed no treatment effects for peer modeling with Arithmetic materials. oBoth subjects showed generalization effects on the non-academic tasks (MFF20). Subject #8 showed a generalization effect in Reading

Subject #7 was described by the trainer and teachers as displaying little motivation and appearing uninvolved. Subject #8 was noted as curious about the modeling process and her progress. The trainer described her as eager.

Subject #7 reported reluctance to use the full modeled (CBM) procedure when taking classroom quizzes. This child said his teacher would not tolerate need to "vocalize" the strategy. Thus, Subject #7 did not fully implement the procedure. This subject's report recalls issues of practicality in using cognitive behavior modification procedures in the classroom which have been advanced by Robin, Armel, and O'Leary (1975) and the effect of lack of full implementation addressed by O'Leary (1980).

Finally, although no treatment effects were noted for Subjects #7 and #8, they demonstrated generalization effects on the MFF20. Quite likely this could be a function of the obtrusiveness of this measure.

CONCLUSION

The above reported four N of 1 studies suggest that there is utility in training cognitively impulsive children using peer modeling of a cognitive behavior modification process with academically relevant training materials. Five of eight subjects demonstrated training effects.

Some evidence exists that the reflective modeling process can generalize from one academic area or task to another.

The studies highlight the important factors of subject motivation, subject awareness of the personal relevance of training, necessity of monitoring for full implementation of the process employed as part of training, and the necessity of monitoring for level of difficulty of assessment measures (in this study, quizzes in academic areas of Reading, Spelling and Arithmetic). Research employing group comparison designs should make attempts to control for the important factors noted above.

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